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Compliments of the Author.

PUERPERAL DIPHTHERIA

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PUERPERAL DIPHTHERIA.

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New York.

THE condition which I propose to describe has received very little, almost no attention, in text-books on obstetrics. Some do not so much as allude to it; others speak in a few lines of "yellow patches." The only one I know in which the importance of it is recognized is that of Dr. Lusk,¹ who relates the observations made by Dr. Steurer, of New York, during an epidemic of so-called puerperal fever in Strassburg, Germany; but here the chief attention is paid to the presence of microbes in these cases.

Dr. A. Jacobi, in his comprehensive work on diphtheria,² mentions the occurrence of the disease in puerperæ, and reports a case in which diphtheria of the pharynx followed the condition in the vagina occurring after an operation for prolapse of the uterus. The distinguished author adds that "a single case of that description proves a great deal." We shall later see that I have observed a somewhat similar case in a puerpera, and know of other cases in which contagion from puerperal diphtheria caused diphtheritic ophthalmia.

While most authors of text-books on obstetrics and puerperal diseases simply ignore diphtheria as a puerperal disease, one of the best of them takes special care to tell us that the condition which has been called diphtheritic in puerperal

¹ W. T. Lusk, *Science and Art of Midwifery*, New York, 1882, p. 617.

² A. Jacobi, *A Treatise on Diphtheria*, New York, 1880, p. 87.



women has nothing to do with diphtheria, and is so far from being anything dangerous that it is to be looked upon as a regenerative process. Spiegelberg,¹ in his admirable work on obstetrics, says: "The torn places become changed to suppurating surfaces, commonly called ulcers, and, when situated at the entrance of the vagina, especially known as *puerperal* ulcers. These ulcers have thick edges, a discolored, yellowish-gray deposit, edematous, and on the labia often erysipelatous surroundings. That deposit, commonly called diphtheritic, has nothing whatever to do with diphtheria. It is composed of fibrin, and a granular mass produced by the decomposition of the most superficial layer of the wound and of the pus-corpuscles. It is a phenomenon accompanying the process of repair begun by the suppuration."

Spiegelberg's reasons for denying the condition to be diphtheria are, first, that the deposit can so easily be scraped off; secondly, the lack of tendency to disintegration of the subjacent tissue; and, thirdly, the appearance of this condition in the later stages of the puerperal process, while they are not present in the most acute. The first two of these assertions are entirely opposed to my own observations. The deposit of which I treat in the following pages can not be scraped off at all. It is so intimately connected with the underlying tissue that, in order to remove it, it would be necessary to cut out some of the adjacent parts. Secondly, it does not only appear as a deposit on wounded surfaces, but it occurs sometimes as an infiltration of apparently healthy mucous membrane, still covered with epidermis. This infiltration, be it of raw or of intact surfaces, has a most decided tendency both to spread superficially to adjacent parts, and to attack the deeper tissues, causing the most serious devastations, often ending in death or in dangerous loss of substance.

That the infiltration, as a rule, appears late is true. Still we have a case in which the patches were observed the day after delivery, and I fail to see how their common appear-

¹ Spiegelberg, *Lehrbuch der Geburtshülfe*, Lahr, 1878, pp. 724, 725.

ance between the fourth and the seventh day can disprove the diphtheritic nature of the condition in question.

I think we have the key to Spiegelberg's underrating of this condition when we notice that all his remarks on the subject come in the shape of an opposition to E. Martin, who had declared the diphtheritic process in the genital canal of puerperal women to be the essence (*das Wesentliche*) of puerperal fever.¹ By thus identifying diphtheria with puerperal fever, Martin went, of course, much too far, and that is probably the reason why the truth contained in his exaggeration did not make any impression, and has been almost totally forgotten. It is easy enough to point out that there are forms of puerperal fever which have nothing to do with diphtheria or anything like a diphtheritic deposit or infiltration. But the truth contained in Martin's assertion is that puerperal diphtheria is one form of that polymorphous entity called puerperal fever, or, I would rather say, one of the different diseases heretofore encompassed by the common name of puerperal fever. At least, it is a group distinctly limited by the appearance of the diphtheritic infiltration somewhere in the genital canal of puerperal women, seriously threatening the patient's life, tolerably well marked by other symptoms, and calling for the most energetic special treatment.

Among the more recent authors, Fischel, of Prague, Breisky's assistant, has understood the danger threatening wounded surfaces in the genital canal of puerperæ, and has therefore insisted upon a prophylactic treatment of such wounds. He has even, like myself, seen parts of the intact surface of the vagina become attacked by diphtheritic infiltration.²

The base of the following exposition form twenty-six cases treated by me in the New York Maternity Hospital, and one in the New York Infant Asylum, during the years 1882 to 1884, viz.:

¹ E. Martin in *Berliner klinische Wochenschrift*, 1871, No. 32, p. 372.

² Fischel in *Archiv für Gynäkologie*, 1882, vol. xx, p. 14.

NAME.	Date of delivery.	Result.	House Surgeon.
<i>First Group:</i>			
1. Lizzie Quinn.....	III, 2, 1882.	Recovered.	Terriberry.
2. Catharine Dillon.....	III, 3, 1882.	"	"
3. Eliza Miller.....	III, 4, 1882.	"	"
<i>Second Group:</i>			
4. Katie Gross.....	IV, 22, 1882.	Died.	Allen.
5. Unknown.....	IV, 1882.	Recovered.	"
6. Ellen Barry.....	IV, 27, 1882.	"	"
<i>Third Group:</i>			
7. Hannah Donovan.....	XI, 1, 1882.	Died.	Pierson.
8. Rose Reynolds.....	XI, 3, 1882.	Recovered.	"
9. Mary Welsh.....	XI, 5, 1882.	"	"
10. Sarah Lesinger.....	XI, 23, 1882.	"	"
11. Josephine Norman.....	XI, 23, 1882.	"	"
12. Annie Kenney.....	XII, 4, 1882.	"	Priest.
13. Catharine Raeder.....	XII, 10, 1882.	"	"
14. Susan Gallagher.....	XII, 11, 1882.	Died.	"
15. Catharine Donovan.....	XII, 19, 1882.	Recovered.	"
<i>Fourth Group:</i>			
16. Hannah Curtin.....	I, 10, 1883.	"	"
17. Maggie McClaim.....	I, 16, 1883.	"	"
<i>Fifth Group:</i>			
18. Mary Galvin.....	II, 1, 1883.	"	Waldo.
19. Bella Daly.....	II, 15, 1883.	"	"
20. Lavina Clements.....	II, 26, 1883.	Died.	"
21. Fanny Strachan.....	III, 3, 1883.	Recovered.	"
22. Jane Killan.....	III, 3, 1883.	"	"
23. Bridget Lally.....	III, 4, 1883.	"	"
24. Mary Finn.....	III, 10, 1883.	Died.	"
<i>Isolated Cases:</i>			
25. Bessie Rosenthal.....	IX, 15, 1883.	Recovered.	Pease.
26. Sophia Sherman.....	III, 9, 1884.	"	Garnett.
27. Cora O'Toole.....	IX, 6, 1884.	" 1	

Pathological Anatomy.—The characteristic feature of the disease is the diphtheritic infiltration. This was in most cases I have seen of a light pearl-gray color, more exceptionally milk-white or sulphur-yellow. It makes its first appearance as discrete spots not larger than millet-seed, but soon these spots extend in all directions and melt together, so as to form one or more large, thick patches, firmly adherent to, imbedded in, and, as it were, dovetailed with the subjacent and surrounding tissue. The patches have commonly round

¹ In the treatment of this case, occurring in the New York Infant Asylum, I had for assistant Dr. Elizabeth Stow Brown.

contours, measure from one eighth to one inch in diameter, and about one eighth of an inch in thickness. Like diphtheria of the air-passages, this infiltration has a predilection for the places where the canal becomes narrower, namely, the entrance of the vagina and the cervix. It is probable that this is due, at least in part, to the predominant frequency of vulnerations at these narrower straits. Another point to be noticed in reference to the locality of the affected parts is, that the posterior wall of the vagina is much more liable to be attacked than the anterior, and on the posterior, again, that part which lies below the cervix. The explanation of this greater liability to be affected of these parts is probably to be sought in their being more thoroughly bathed with the fluid coming from the uterus, which stagnates there, becomes mixed with germs suspended in the air entering the genital tract, and undergoes decomposition. All torn and abraded surfaces become more easily a prey to the diphtheritic infiltration. But, as stated above, I have repeatedly seen entirely healthy parts of the mucous membrane of the vagina, yet covered with epidermis and separated by intervening tissue from all tears and abrasions, become the seat of the affection. In one case the inside of the labia majora was alone affected.

The parts surrounding the patches are more or less swollen, dark red, brown, or dirty greenish. The connective tissue of the small and the large pelvis is infiltrated with a turbid serous fluid, and sometimes the seat of hemorrhagic thrombosis.

The skin is sometimes the seat of a dusky erythema composed of minute spots the size of a pin's head, on a level with the surrounding skin, and disappearing on pressure. In one case (Finn) the erythema was in some places mixed with petechiæ, spots as large as hemp-seed, bluish-brown, and not influenced by pressure. The same patient developed later erysipelas. These skin affections were not continuous with that of the genitals, but were found on the body and the extremities.

In the five cases ending fatally, autopsies were made by the curators of the hospital.

The uterus is very much enlarged, sometimes reaching nearly up to the umbilicus, a week or two after delivery. The cervix may be more or less torn, bruised, jagged, of a dirty-red, dark-brown, or greenish color, yet showing diphtheritic patches, or a fine gray film, like what is called the bloom on grapes. In bad cases, large portions of it, as well as of the vagina, become gangrenous. At other times, it is normal, and the affection limited to the body of the womb. The walls of the body are commonly very thick, ranging from one to two inches. The tissue is soft, friable, pulpy, near the inner surface almost diffluent, dark cherry-colored, and bathed in a thick, dirty-greenish fluid. In one case (Hannah Donovan), surrounding either opening of the Fallopian tubes, was found a yellow diphtheritic patch, about the size of a three-cent piece, from which a yellow layer of diphtheritic infiltration could be traced out over a considerable part of the wall, near to the peritoneal surface. Such a disposition of the diphtheritic infiltration explains how a large portion of the muscular tissue of the uterine wall may be scooped out from its connection with the rest of the organ, and lie loose in the cavity until it is finally pushed out of the genitals. I have observed eight such cases, and described six of them in other places, under the name of "Dissecting Metritis." Whether that condition is always due to diphtheria I could not tell, since, of the eleven cases known, ten patients recovered, and no diphtheritic affection was visible in some of them, in the parts accessible to view. Here we have only to do with those cases which were proved by clinical observation, or post-mortem examination, to be of that nature. They are four in number (Gross, Lesinger, Killan, and Rosenthal). In the first, the detached portion of the uterine wall was found, at the autopsy, lying entirely loose in the cavity of the body. It measured four inches in length,

¹ *New York Medical Journal*, 1882, vol. xxxvi, p. 587. *Archives of Medicine*, April, 1883.

two in width, and one in thickness. No ulcers were found; but the wall was in some places as thin as tissue-paper, and there were two small openings leading into two loops of the small intestines. In the three other cases, similar bodies were expelled from the genitals, respectively eighteen, nineteen, and twenty-five days after delivery. All these specimens are very much alike. They are more or less pear-shaped, in accordance with the cavity in which they are retained. They have an offensive odor. The outer surface is gray; the inner tissue flesh-colored. They are full of small holes, leading into canals, uterine sinuses, from which often a white, elastic thrombus protrudes. Microscopical examination shows that these specimens consist of smooth muscle-fibers, in a more or less advanced stage of fatty degeneration. The amount of connective tissue between the bundles and cells is considerably increased, in consequence of the inflammation. The thrombi are in a condition of organization, being composed of a net-work of fibrin, with interspersed round cells.

The mucous membrane of the Fallopian tubes is red, swollen, injected, and covered with a purulent fluid.

The ovaries are infiltrated with turbid serum. The lymphatic vessels in and leading from the uterus are filled with a grumous yellow mass, or purulent fluid. The veins are sometimes blocked up by thrombi.

In three cases only (Gross, McClaim, Clements) peritonitis, with the common exudation and agglutination, was found.

The liver, the spleen, and the kidneys are enlarged, dark, soft, friable, and the microscope reveals the presence of parenchymatous inflammation. The lungs are filled with turbid serum, compressed or emphysematous. In one case (Clements), beneath the thickened pleura were found hemorrhagic spots, numerous small abscesses, and in some places a gangrenous condition. Another (O'Toole) developed pleuritis, followed by croupous pneumonia. The articulations may likewise become the seat of inflammation (McClaim). The bladder was in several cases the seat of an acute simple

catarrh. In one the mucous membrane of the intestine was ulcerated.

Etiology.—Every circumstance that protracts labor, or causes wounds of the genital canal, the introduction of the hand into the womb, and a previously weak condition of the patient predispose to puerperal diphtheria. Thus, among our twenty-seven hospital cases, we had seventeen primiparæ, fourteen tedious labors, five contracted pelves, twice narrowness of the soft parts of the parturient canal, three times a large child, once too advanced ossification of the head, once an occipito-posterior position, and once a breech presentation. Forceps were used six times, and most of these operations were very difficult, tedious, and taxing the strength of the accoucheur to the utmost. In one case delivery was only obtainable by means of perforation and the cranioclast. In another manual extraction was necessary. In two cases the whole hand was introduced into the womb, and the vaginal examinations with the finger were often unnecessarily extended into the womb by zealous young assistants, not yet restrained by the orders relating to the new treatment inaugurated on October 1, 1883. Seven times the perineum was more or less lacerated. Once there was a piece of the membranes retained for five days. In another case a small piece of the placenta was found attached to the inside of the uterus at the autopsy.

One of the patients showed distinct marks of tertiary syphilis, another had had eclampsia, two were exhausted by post-partum hemorrhage, one had fallen into collapse immediately after the birth of the child, one was a dwarf, and in one the autopsy revealed an old encapsuled liver-abscess and chronic catarrhal pneumonia.

But the real cause of the disease is an infection coming from outside. It will be noticed that our Maternity Hospital cases came in groups, the single components of which occurred on the same day, or with a few days' interval.¹ I could

¹ The long intervals between the second and third, and after the fifth group, correspond to times when I was not on duty as Visiting Obstetrician, and for

never find any evidence that the infection went directly from one patient to the other, nor that the poison was brought from one to the other by doctors or nurses. It seemed to be in the air of the wards. The proof of this is that, every time a ward had been fumigated with sulphurous acid, we were sure not to have a seriously sick patient, and especially not a case of puerperal diphtheria, for a week. That the disease is due to a poison coming from outside is amply proved by its total disappearance when the new prophylactic treatment was introduced, which presently will be described.

According to Steurer, Heiberg, and others, the morbid agents are microbes, which are found in innumerable hosts from the wounds in the genitals through vessels and cavities up into the parenchymatous organs.

Symptomatology.—The first symptom which shows a deviation from the normal course of childbed is the fever, which mostly occurs from two to four days after delivery, more exceptionally on the same day, or as late as six or seven days after. Sometimes it is ushered in by a decided chill, or by a chilly sensation. The temperature may at once rise to 103° or 104° Fahr., but commonly it is lower, and rises gradually. The highest temperatures in our patients ranged from 100·6° to 107°, and in the majority it was between 102° and 104°. The temperature has no typical curve, except that, as a rule, it is higher in the evening than in the morning.

The highest frequency of the pulse ranged from 88 to 160 beats per minute; in the majority between 112 and 120. It has a great tendency to become weak.

The highest rate per minute of the respiration ranged from 28 to 58; in the large majority of cases it varied between 28 and 32.

Anorexia, vomiting, diarrhea, and a coated tongue bear

this paper I have only used the cases occurring in my own service. Bessie Rosenthal was delivered in the time of one of my colleagues, but the after-treatment and the expulsion of the loosened portion of her uterus took place during my term.

witness of the disturbance in the intestinal canal. Generally, the patient complains of pain in the hypogastric region, or in one or both groins, sometimes extending down into the legs. On examination, we find the uterus larger than what would correspond to the time elapsed since her delivery, and quite tender. Sometimes this tenderness is spread more or less over the abdomen, and very often it is found in the groins, where likewise some swelling may be observable.

The lochial discharge is often scanty, dirty-grayish, offensive; but in several cases we found it normal. In those which ended in expulsion of a portion of the uterus there was a protracted purulent discharge until the loose body was expelled.

The signs of a general disturbance of the system precede often the appearance of the diphtheritic infiltration for several days. Thus the patches appeared in our cases from two to ten days after confinement, commonly from three to seven days. In the anatomical part we have already described the formation and appearance of these patches. Suffice it here to add that, as a rule, the disease spreads for several days, either by the extension of already affected places, or by the appearance of new centers at a distance from the first ones. This spreading stopped in our cases from three to eight days after the special treatment, presently to be indicated, was begun. In one (Rose Reynolds) it went on even for twenty-six days. From the time the infiltration ceases until the sloughs produced by cauterization are eliminated by suppuration, and the sores are all healed, there elapses about a week.

The case just referred to as having presented an unusual length of the period of formation of new patches was of particular interest, because in her *the same affection appeared simultaneously on the tongue*. This corresponds with the above-mentioned observation by Dr. Jacobi, and corroborates me in my view that this disease is identical with diphtheria as occurring on non-puerperal wounds, or as primary disease

without any wound, and most commonly localized in the throat, but found on all other mucous membranes.

A friend of mine, who is visiting physician to a lying-in hospital, was, during an epidemic of puerperal diphtheria in the institution, which kept him busy there a great part of the day, attacked by diphtheritic ophthalmia, with formation of a thick diphtheritic membrane on the conjunctiva, a perforating ulcer of the cornea, and the loss of the sight on the affected eye. His head nurse was, at the same time, attacked by the same disease, resulting in the same condition.

Six times tympanites was observed, but three patients only developed peritonitis.

The nervous system proved affected in some cases by the occurrence of severe headache, stupidity, or delirium.

Very commonly some disturbance in the secretion or evacuation of the urine takes place. We have met with enuresis and retention. Often micturition is frequent and painful, and the urine contains bladder epithelium and indifferent cells.

Three patients (Hannah Donovan, Raeder, and McClaim) had albuminuria: one slight, one with 10 per cent., and one with 25 per cent. albumin. At the same time, the amount of urine secreted was diminished. Another patient had scanty urine, with symptoms of uremia.

Of the occurrence of edema of the labia, erythema, petechiæ, and erysipelas, we have already spoken in the anatomical part.

In two cases (McClaim, Sherman) jaundice bore testimony to the perverted condition of the blood. The sweet breath and profuse perspiration characteristic of septicemia were likewise observed twice (McClaim, Galvin).

One patient (McClaim) developed a painful and tedious arthritis of the right elbow-joint, a gangrenous bed-sore of the size of a silver dollar, extending in depth to the sacral bone, and a sore spleen, which percussion proved to be enlarged.

About the expulsion of a large portion of the uterus in several patients I refer to the anatomical part.

When once the diphtheritic process has stopped, the patients recover rapidly.

Diagnosis.—The diagnosis need scarcely be mentioned. The diphtheritic infiltration once seen, the diagnosis is made. Still, the treatment may have effects which may lead to error. Under the bichloride-of-mercury occlusion-bandage, presently to be recommended, torn or abraded surfaces take a yellow color, which might simulate a diphtheritic deposit, but it differs from it by being strictly limited to the surface of the wound, where it forms a thin continuous layer, while diphtheritic infiltration begins in discrete spots, forms a thick membrane, and spreads into the surrounding tissue, and may appear in apparently intact mucous membrane. Besides, there is no fever nor any other symptom of disease, and these surfaces heal in a short time without other treatment than the continued use of the bandage.

Another difficulty arises from the cauterization with chloride of zinc, which is the treatment I recommend. The slough produced by this drug has exactly the same light-gray color which most commonly is that of the diphtheritic infiltration, and the physician may be in doubt, when he examines the patient the next day, whether the diphtheritic affection has spread or not. In order to obviate this, he must first remember which parts he has cauterized; and, secondly, examine the edges of the doubtful place closely. The diphtheritic infiltration always spreads with a finely scalloped outline, formed by an uneven extension, while the slough retains the simple contour of the place where it was put.

Prognosis.—The prognosis as to event is doubtful. Five of my twenty-seven patients died, representing a mortality of 18.5 per cent. One of them might, perhaps, have survived, since she lived thirty-two days, and the post mortem showed that all ulcers were entirely healed. The immediate cause of her death was rupture of her uterus, which, in consequence of dissecting metritis, was, in some places, as thin as

paper, the rupture being due to an intra-uterine injection, faultily performed by an assistant. The other four died, respectively, five, seven, ten, and fifteen days after delivery. The prognosis is in so far good as we have excellent remedies against the disease. Martin¹ said that one third of the patients died. It is probably due to the improved treatment that our mortality is not even one fifth. The whole duration of the disease in those who recover is in most cases about two weeks.

As a rule, the patients return to complete health; but an exception must be made with regard to those from whose womb a large portion is scooped out by dissecting metritis. Here it can scarcely be otherwise than that the organ is left in a considerably weakened condition, which may interfere with future pregnancies, and especially predispose to rupture of the uterus at the time of parturition.

Treatment.—As to prophylaxis, it must be recommended to limit the vaginal examinations as much as other considerations will allow, and especially not to introduce the finger, and much less the hand, into the uterus, unless it be absolutely necessary. The delivery ought to be conducted in such a way as to avoid wounds of the genital canal as much as possible.² Instruments ought to be used with great care; but the most important of all is a thorough antiseptis, especially by means of bichloride of mercury. For the details of this treatment I must refer to my paper on "Prevention of Puerperal Infection."³ Suffice it here to say that the principle in it is the disinfection of the hands of the doctors and nurses, and every substance that comes in contact with the genitals of the patient, and the application to the same of an *occlusion-bandage*, so arranged that no air can enter them without being filtered through a pad wrung out in a solution of bichloride of mercury (1:2,000). In the hospital, this

¹ *L. c.*, p. 376.

² See Garrigues, "The Obstetrical Treatment of the Perineum," in *Am. Jour. Obst.*, vol. xlii, pp. 241-252, 1880.

³ *The Medical Record*, December 29, 1883, vol. xxiv, p. 703.

bandage is composed of a piece of absorbent lint, eight by twelve inches, folded twice so as to be three inches wide, and wrung out in the said solution ; a piece of oiled muslin, four by nine inches, washed with the same ; a pad of oakum ; and a piece of muslin, eighteen inches square, folded like a cravat, and fastened to the binder with four pins, in front and behind. In private practice, I use the same bandage, composed of finer materials, viz. : a pad of absorbent cotton wrung out in the solution, a piece of thick, strong gutta-percha tissue, washed in the same, a pad of dry absorbent cotton, and a piece of canton flannel, five inches wide, fastened to the binder. Since this treatment was introduced in the Maternity Hospital, I did not, for six months, see a case of puerperal diphtheria there, except that of a woman (Sherman) in whom it was probably attributable to the recklessness of an assistant, who examined her immediately after having delivered a woman of a macerated child, and removed a putrid placenta from her womb. Torn perineæ are cleansed with the solution of bichloride, dusted with iodoform, and stitched up.

When once the disease is developed, a very energetic treatment is necessary. I have in vain tried tincture of iodine, iodoform, and undiluted carbolic acid. The only local application that has given me satisfaction is the chloride of zinc. All the affected parts within view are thoroughly touched with a solution of equal parts of chloride of zinc and distilled water. If the cervical canal is affected, I cauterize the whole surface up to the internal os. Formerly I used to wash out the uterus with a two-per-cent. solution of carbolic acid, until it came out clean, then inject a fluidrachm of a solution of chloride of zinc, one part to twelve, and then again wash out with the carbolized water. Experience has shown that this intra-uterine use of the chloride of zinc was not without danger. I have repeatedly seen severe pain and a quite alarming collapse follow the injection, and one patient (Gallagher) never rallied from it ; but the autopsy showed all her organs to be in such a condition that her life

could only have been protracted for a few hours anyhow. After that we used the injection warm, and did not have any more trouble. In one very protracted case, we substituted for the carbolized water, which did not seem to agree with the patient, the saturated solution of boracic acid. The application of the one to one solution in the vagina is rather painful. In nervous patients it is therefore better to use an anesthetic. After the introduction of the bichloride of mercury I have given up the intra-uterine injection of the chloride of zinc altogether. In the two cases I have treated since then, I substituted a warm one-to-two-thousand solution of bichloride of mercury for both chloride of zinc and carbolic acid, and introduced a suppository with one hundred grains of iodoform.¹ Both cases were very severe, and both recovered. As long as we used carbolic acid the intra-uterine injections were, as a rule, repeated every three hours. The bichloride injection, followed by the iodoform pencil, has the great advantage that the process need not, as a rule, be repeated more than once in the twenty-four hours. The vagina is douched with the same solution every three hours. Besides, it ought to be examined once in the twenty-four hours, and, if the diphtheritic process has spread, the application of the one to one solution of chloride of zinc is repeated. It is done with absorbent cotton, wound round the end of wooden sticks. If the process is limited to the vulva and vagina, vaginal injections alone are used every three hours.

Besides this local treatment I give fluid extract of ergot (f ʒss. to 1) three times a day, in the hope of making the uterine muscle-fibers contract, some morphine to alleviate pain, quinine (gr. v, x, xv, t. i. d.), plenty of alcoholic stimulants, by the mouth or hypodermically, tincture of digitalis (℥v hypodermically, repeated according to circumstances),

¹ R Iodoformi, ʒ x; amyli, glycerinæ, āā ʒ j; pulv. acaciæ, ʒ ij. M. Make six suppositories, of the shape of a little finger (after Elmendorf). A pair of forceps as curved as a male catheter is needed for the easy introduction of the suppository through a speculum into the body of the womb. I have had one made for the purpose by Ford.

to strengthen the pulse. If the high temperature continues in spite of intra-uterine treatment, it is combated by sponge-baths, cold pack, cold baths, ice-bags or rubber-coil, with running ice-water, salicylate of soda, or antipyrin. Carbolic acid, in the dose of one minim every hour, is good, both as antipyretic and to combat the diarrhea. Sometimes I combine it with the same amount of compound tincture of iodine. If the temperature is not very high, I prefer warm poultices to ice-bag or coil. In peritonitis I give the enormous doses of morphine prescribed by the so-called *opium plan*,¹ combined with ice-bags on the abdomen, except when the patient suffers from diarrhea. Then a light warm poultice is preferable.

¹ Garrigues, "The Opium Plan in Puerperal Peritonitis," in *New York Medical Journal*, January 24, 1885, vol. xli, p. 98.

